

REMARKS

In response to the Office Action mailed November 13, 2002, Applicants respectfully request reconsideration. To further the prosecution of this Application, Applicants submit the following remarks and have amended some claims. The claims as now presented are believed to be in allowable condition.

Claims 1-18 and 22-27 are pending in this Application. Claims 1, 13, 26 and 27 are independent claims.

Please note that Applicants are attempting to comply with the Patent Office's request for an Amendment submission under the Current Image Technology Pilot Project, as requested by the Patent Office in the Office Action mailed November 13, 2002.

In the Drawings

The Drawings were objected to due to a few minor informalities. Applicants wish to thank Examiner Alcala for further explaining the objection to Fig. 3 (i.e., that sections of dielectric material are to have crosshatches which are different to distinguish between layers).

Applicants have submitted a proposed amendment to the Drawings to cure these informalities in accordance with the Proposed New Rule Changes. In particular, Applicants have provided a replacement Fig. 3 which includes desired changes (i.e., sections of dielectric material labeled with crosshatches which are different to distinguish between layers), without markings, in compliance of §1.84.

Additionally, in response to the objection raised in the earlier Office Action of March 13, 2002, Applicants have provided a replacement Fig. 2 which corrects a misplaced reference numeral (i.e., reference numeral 52 in Fig. 2) as pointed out by that earlier Office Action on page 3, lines 5-9. Further, Applicants have replaced a dashed phantom line in Fig. 2 with a differently dashed phantom line as pointed out by that earlier Office Action on page 2, paragraph 4. No new matter has been added.

For the reasons stated above, the objection to the Drawings should be withdrawn.

Rejections Under 35 USC §112, Second Paragraph

Claims 1-18 and 22-27 were rejected under 35 USC §112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter of the invention. As the basis for this rejection, minor informalities were pointed out in claims 1, 3, 7 and 12 and issues were raised in connection with claims 13, 18 and 27.

Applicants have made clarifying amendments to claims 1, 3, 7 and 12 to cure the minor informalities, and respectfully traverse the issues raised in connection with claims 13, 18 and 27. Each of these matters will now be individually discussed.

In connection with claim 1, the Office Action points out a minor informality (see page 3, third paragraph of the Office Action). Applicants wish to thank Examiner Alcalá for pointing out this minor informality which was inadvertently overlooked when Applicants amended claim 1 in the last Amendment. By this Amendment, Applicants have amended claim 1 to cure this minor informality. Accordingly, the rejection of claim 1 under 35 USC §112, second paragraph, should now be withdrawn.

In connection with claim 3, the Office Action indicates that certain ground pad features are unclear (see page 3, fourth paragraph of the Office Action). Applicants have amended claim 3 to clearly indicate that a bottom surface of a circuit board portion is substantially coplanar with a top surface of the circuit board portion to clear up any confusion. Furthermore, Applicants wish direct attention to Fig. 3 of the Specification which shows, by way of example only, a configuration which provides support for the embodiment recited in claim 3. Fig. 3 shows a first ground pad 70-A disposed on a first surface 66-A of a circuit board section 24, and a second ground pad 70-B disposed on a second surface 66-B of the circuit board section 24. Fig. 3 further shows the second surface

66-B as clearly being substantially coplanar with the first surface 66-A. Fig. 3 further shows the ground pads 70-A, 70-B physically contacting each ground via 48 and further physically contacting each ground via 50. Accordingly, the rejection of claim 3 under 35 USC §112, second paragraph, should now be withdrawn.

In connection with claim 7, the Office Action contends that the claim omits essential structural cooperative relationships and questions how a recited pin attaches to other elements (see page 3, fifth paragraph of the Office Action). Although Applicants respectfully disagree with this contention, in order to further the prosecution of the Application, Applicants have amended claim 7 to indicate that the recited pin physically couples to a signal conductor of a signal layer of a circuit board portion. For example, support for the embodiment recited in claim 7 is provided in Fig. 3 which shows a pin 30 physically coupling to a signal conductor 60 through a signal via 46 and a solder joint 58. Accordingly, the rejection of claim 7 under 35 USC §112, second paragraph, should now be withdrawn.

In connection with claim 12, the Office Action contends that the claim omits essential structural cooperative relationships and questions how a connector connects and attaches to the signal launch and how it is related to the ground and signal vias (see page 3, last paragraph to page 4, first paragraph of the Office Action). Although Applicants respectfully disagree with this contention, in order to further the prosecution of the Application, Applicants have amended claim 12 by removing the language under contention. Accordingly, the rejection of claim 12 under 35 USC §112, second paragraph, should now be withdrawn.

In connection with claim 13, the Office Action expresses concern over the term "section". Applicants wish to respectfully point out that this term is no longer in the claim and suspect that this concern was inadvertently left over from the earlier Office Action. The Office Action additionally contends that it is not clear if the recited "coaxial connector" is part of the circuit board or if it is a separate

element or device attached to the circuit board. Applicants wish to respectfully point out that the recited "coaxial connector" is a separate element and that the circuit board and the coaxial connector both belong to a connection system. The Office Action further contends that the claim omits essential structural cooperative relationships of elements and questions how the recited coaxial connector connects and attaches to the recited signal launch and how it is related to the recited ground and signal vias. Applicants wish to respectfully point out that claim 13 is clear on this point, namely that the recited coaxial connector mounts to the signal launch of the circuit board. For example, a manufacturer could use screws and nuts through the coaxial connection and a set of ground vias of the circuit board to mount the coaxial connector to the circuit board as explained in the Specification for example on page 4, lines 20-24. Accordingly, the rejection of claim 13 under 35 USC §112, second paragraph, should be withdrawn.

In connection with claim 18, the Office Action contends that the claim omits essential structural cooperative relationships of elements and questions how the pin is located in relation to the coaxial connector (see page 4, third paragraph of the Office Action). Applicants wish to respectfully point out that claim 18 is clear on this point, namely the recited signal pin extends perpendicularly from a plane of the circuit board portion. The Office Action further questions whether the recited pin has a portion inside the connector or whether the pin is completely inside the circuit board. By way of example only, the pin can extend from the circuit board as shown in Fig. 3 and the coaxial connector can include a conductive sleeve that receives a portion of the pin. However, it should be understood that this explanation is provided by way of example only and is not intended to limit claim 18 beyond the claim language itself. Accordingly, the rejection of claim 18 under 35 USC §112, second paragraph, should be withdrawn.

In connection with claim 27, the Office Action indicates that it is not clear if the "coaxial connector" is part of the circuit board or if it is a separate element or

device attached to the circuit board (see page 4, last paragraph of the Office Action). Applicants wish to respectfully point out that the recited "coaxial connector" is a separate element and that the circuit board and the coaxial connector both belong to a connection system. The Office Action further contends that claim 27 omits essential structural cooperative relationships of elements and questions how the recited coaxial connector connects and attaches to the recited signal launch and how it is related to the recited ground and signal vias. Applicants wish to respectfully point out that claim 27 is clear on this point, namely that the recited coaxial connector mounts to the signal launch of the circuit board. For example, a manufacturer could use screws and nuts through the coaxial connection and a set of ground vias of the circuit board to mount the coaxial connector to the circuit board as explained in the Specification for example on page 4, lines 20-24. Accordingly, the rejection of claim 27 under 35 USC §112, second paragraph, should be withdrawn.

Rejections Under 35 USC §102 and §103

Claims 1, 5-7, 9, 11-13, 16-18 and 22-27 were rejected under 35 USC §102(e) as being anticipated by U.S. Patent No. 6,392,160 (Andry et al.). Claims 4, 10 and 15 were rejected under 35 USC §103(a) as being unpatentable over Andry et al. Claims 2, 3 and 14 were rejected under 35 USC §103(a) as being unpatentable over Andry et al. in view of U.S. Patent No. 6,407,652 (Kan). Claim 8 was rejected under 35 USC §103(a) as being unpatentable over Andry et al. in view of U.S. Patent No. 5,624,278 (Kuroda et al.).

Andry discloses a multi-layer backplane 10 (column 2, lines 65-67 and Fig. 1). Connector center pins 22C connect to plated-through holes 37 of the multi-layer backplane 10, and the plated-through holes 37 connect to signal traces within a trace layer 20T-4 (column 5, lines 50-59 and Figs. 2A through 2E). The portion of the plated-through holes 37 below the terminal end of the connector center pins 22C down to the last ground plane later 44G-N is removed, such as by drilling, to remove the conductive plating (column 5, lines 59-63 and

Figs. 2A through 2E). A cap layer 49 connects to vias 39, 91 and extends over the plated through holes 37 (column 6, lines 13-61 and Figs. 2B through 2E). In each situation, the leakage path L for RF energy from the center pins 22C is closed off (column 6, lines 17-33). That is, the cap layer 49 isolates each connector and prevents leakage of RF energy between connector center contacts (column 6, lines 33-35).

Kan discloses an adapter 1 having a ground plane 2 having holes 3 and openings 4 (column 3, lines 47-49 and Fig. 1).

Kuroda discloses an electric wire connector which is attached to an end of a signal cable (column 1, lines 8-9). In particular, Kuroda discloses a coaxial cable connector 1 having an electrically conductive outer conductor 2 which is cylindrically shaped (column 4, lines 16-18).

Claims 1-12 and 22-23

Claim 1, as amended, is directed to a circuit board which includes a circuit board portion having a top surface, a bottom surface, a signal layer, a ground layer, and dielectric material that physically separates the signal layer and the ground layer. The circuit board further includes a signal launch having a signal via that physically contacts a signal conductor of the signal layer and the dielectric material of the circuit board portion. The signal via extends entirely through the circuit board portion from the top surface of the circuit board portion to the bottom surface of the circuit board portion. The signal launch further has a first set of ground vias and a second set of ground vias that physically contact a ground conductor of the ground layer and the dielectric material of the circuit board portion. Each of the first set of ground vias is disposed a first radial distance from the signal via. Each of the second set of ground vias is disposed a second radial distance from the signal via. The first and second radial distances are different.

The cited references do not teach or suggest, either alone or in combination, a circuit board which includes (i) a circuit board portion having a top

surface and a bottom surface, and (ii) a signal launch having a signal via that extends entirely through the circuit board portion from the top surface of the circuit board portion to the bottom surface of the circuit board portion, as recited in claim 1. Rather, Andry discloses plated-through holes 37 which connect to signal traces within a trace layer 20T-4 of the multi-layer backplane 10 and a cap layer 49 which extends over the plated through holes 37 (e.g., see column 6, lines 13-61 and Figs. 2B through 2E of Andry). If one were to argue that a plated-through hole 37 of Andry was a signal via as recited in claim 1, the signal via would not extend entirely through a circuit board portion from a top surface of the circuit board portion to a bottom surface of the circuit board portion. To the contrary, Andry's cap layer 49 would extend over the signal via to close off a leakage path L for RF energy from connector center pins 22C (e.g., see column 6, lines 17-33 of Andry).

Furthermore, it is unclear how one could modify the plated-through hole 37 of Andry such that the signal via extends entirely through a circuit board portion from a top surface of the circuit board portion to a bottom surface of the circuit board portion since, in Andry, the cap layer 49 isolates each connector and prevents leakage of RF energy between connector center contacts (e.g., see column 6, lines 33-35 of Andry). Kan, which the Office Action contends teaches a ground pad (see page 13, second paragraph of the Office Action) does not teach or suggest how one could modify the plated-through hole 37 of Andry to provide the circuit board of claim 1. Similarly, Kuroda, which the Office Action contends teaches a signal pin that connects to a circuit board through a solder joint (see page 14, last paragraph of the Office Action) does not teach or suggest how one could modify the plated-through hole 37 of Andry to provide the circuit board of claim 1.

For the reasons stated above, claim 1 patentably distinguishes over the cited references and the rejection of claim 1 under 35 USC §102(e) should be withdrawn. Accordingly, claim 1 is now in allowable condition.

Because claims 2-12 and 22-23 depend from and further limit claim 1, claims 2-12 and 22-23 are in allowable condition for at least the same reasons. Moreover, it should be understood that the depend claims recite additional novel features.

For example, claim 4 recites a feature that the signal via has an inner diameter that is smaller than an inner diameter of each of the first set of ground vias. The Office Action contends that this is an obvious matter of design choice (see page 11, last paragraph of the Office Action). Applicants respectfully traverse this contention. A benefit of this feature is that the signal via has a narrow inner diameter that is convenient for receiving a pin but allows the first set of the ground vias to have a somewhat larger inner diameter for improved manufacturability (e.g., simpler drilling and plating) and signal integrity purposes. This feature is explained in the Specification for example on page 6, lines 1-12.

A similar argument applies to claim 5. The Office Action appears to contend that Andry teaches this feature by directing the reader to reference number 91 (see page 6, second paragraph of the Office Action). Applicants respectfully traverse this contention. There is no teaching or suggestion in Andry of any signal via having a different diameter than ground vias, as recited in claim 5. If anything, in Andry, the diameters of the plated-through hole 37 and the adjacent plated-through holes 39, 91 look to have the same diameters. If the rejection of claims 4-5 is to be maintained, Applicants respectfully request that it be pointed out with particularity where Andry provides such a teaching.

As another example, claim 6 recites a feature of each of the first set of ground vias having an inner diameter that is smaller than an inner diameter of each of the second set of ground vias. The Office Action appears to contend that Andry teaches this feature directing the reader to reference number 91 (see page 6, last paragraph of the Office Action). Applicants respectfully traverse this contention. There is no teaching or suggestion in Andry of each of a first set of ground vias having an inner diameter that is smaller than an inner diameter of each of a second set of ground vias, as recited in claim 6. If anything, in Andry,

the diameters of the plated-through holes 37, 39, 91 look to have the same diameters. If the rejection of claim 6 is to be maintained, Applicants respectfully request that it be pointed out with particularity where Andry provides such a teaching.

Claims 13-18 and 24-25

Claim 13, as amended, is directed to a connection system which has a circuit board that includes (i) a circuit board portion having a top surface, a bottom surface, a signal layer, a ground layer, and dielectric material that physically separates the signal layer and the ground layer, and (ii) a signal launch. The signal launch has a signal via that physically contacts a signal conductor of the signal layer and the dielectric material of the circuit board portion. The signal via extends entirely through the circuit board portion from the top surface of the circuit board portion to the bottom surface of the circuit board portion. The signal launch further includes a first set of ground vias and a second set of ground vias that physically contact a ground conductor of the ground layer and the dielectric material of the circuit board portion. Each of the first set of ground vias is disposed a first radial distance from the signal via. Each of the second set of ground vias is disposed a second radial distance from the signal via. The first and second radial distances are different. The connection system further includes a coaxial connector that mounts to the signal launch of the circuit board in order to provide electrical access to the signal and ground conductors of the circuit board portion.

As mentioned above in connection with claim 1, the cited references do not teach or suggest, either alone or in combination, a connection system having a circuit board which includes (i) a circuit board portion having a top surface and a bottom surface, and (ii) a signal launch having a signal via that extends entirely through the circuit board portion from the top surface of the circuit board portion to the bottom surface of the circuit board portion, as recited in claim 13. Accordingly, claim 13 patentably distinguishes over the cited references for at

least the same reasons as claim 1 and the rejection of claim 13 under 35 USC §102(e) should be withdrawn. Thus, claim 13 is now in allowable condition.

Because claims 14-18 and 24-25 depend from and further limit claim 13, claims 14-18 and 24-25 are in allowable condition for at least the same reasons. Moreover, it should be understood that the depend claims recite additional novel features. For example, claims 15-17 further patentably distinguish over the cited prior art for the same reasons as set forth above in connection with claims 4-6, respectively.

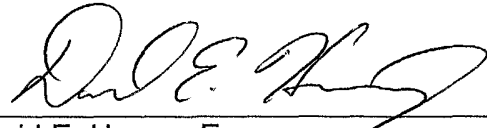
Conclusion

In view of the foregoing remarks, this Application should be in condition for allowance. A Notice to this affect is respectfully requested. If the Examiner believes, after this Response, that the Application is not in condition for allowance, the Examiner is respectfully requested to call the Applicants' Representative at the number below.

Applicants hereby petition for any extension of time which is required to maintain the pendency of this case. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 50-0901.

If the enclosed papers or fees are considered incomplete, the Patent Office is respectfully requested to contact the undersigned collect at (508) 366-9600, in Westborough, Massachusetts.

Respectfully submitted,



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